

1. Prove that all objects regardlessly of their mass fall with the same acceleration (g) in the absence of air resistance.

$M \gg m$

$a_y = \frac{-F_g}{M}$

$a_y = \frac{-\cancel{M} \cdot g}{\cancel{M}}$

$a_y = -g$

$a_y = \frac{-F_g}{m}$

$a_y = \frac{-\cancel{m} \cdot g}{\cancel{m}}$

$a_y = -g$

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CASE A

Which string breaks first?

F_{PS} is applied as a fast jerk.

string 2 breaks first

Inertia of the ball (measured by its mass; ability to resist the acceleration) prevents the transfer of F_{PS} from string 2 to string 1.

CASE B $m = \text{HUGE}$

Which string breaks first?

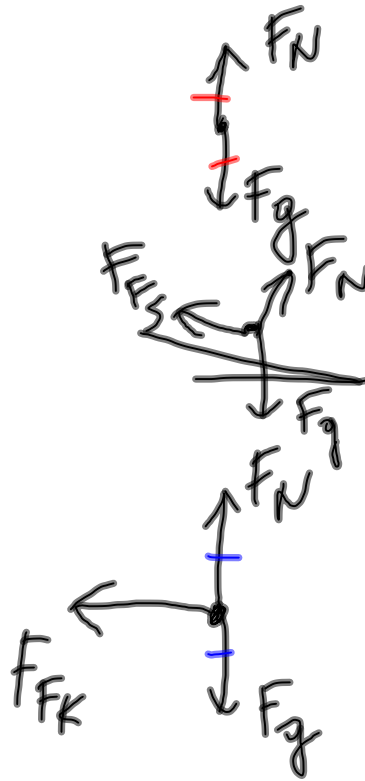
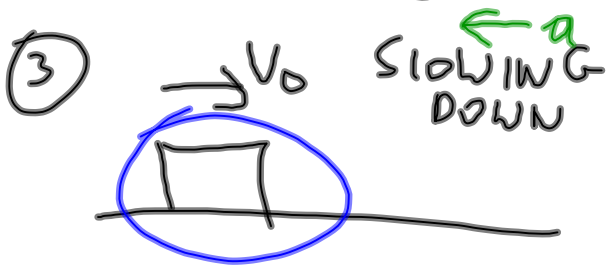
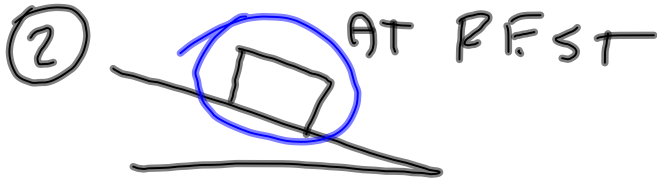
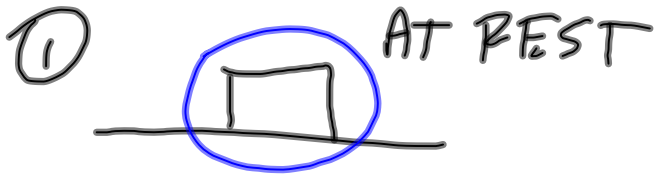
F_{PS} is applied as a gradual pull.

string 1 breaks first

Since the pull is slow and gradual, the inertia of the ball doesn't matter and the entire force F_{PS} is transferred to string 2 to string 1.

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DRAW FBD (BOOK)



Dec 10-9:52 AM